

Claim 68, Lines 1-2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 69, Line 1, delete "carbon source" and insert therefor --elemental carbon--;

Claim 70, Lines 1-2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 71, Lines 1-2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 83, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 84, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 181, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

NE? Claim 201, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 212, Line 2 delete "carbon source" and insert therefor --elemental carbon--;

Claim 213, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 222, Line 2, delete "carbon source" and insert therefor --elemental carbon--;

Claim 230, Line 2, delete "carbon source" and insert therefor --elemental carbon--.

REMARKS

The Office Action has objected to the specification and rejected Claim 45-67, 71-84, 96, 160-171, 175-196, 200-209, 213, 215-216, 218 and 220-227 under 35 U.S.C. §112, first paragraph, as allegedly being non-enabling. The Office Action has objected to the specification and has rejected Claims 60, 180 or 182-203 under 35 U.S.C. §112, first paragraph for allegedly failing to provide a written description of the

invention and for allegedly being non-enabling. In addition, the Office Action has rejected Claims 83-84, 160-181 and 222-229 under 35 U.S.C. §112, second paragraph, for allegedly failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. In addition, Claims 45-84, 96 and 160-231 are being rejected under 37 C.F.R. §1.78(b). Furthermore, Claims 45-84, 96 and 160-231 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over Claims 45-68 of copending application Serial No. 08/486,669. Claims 182-191 and 194-202 are rejected under 35 U.S.C. §102 (b) as defining subject matter which is allegedly anticipated by the teachings in U.S. Patent No. 2,957,756 to Bacon, et al. ("Bacon, et al."). Moreover, Claims 45-54, 58, 62-63, 65, 76-80, 83-84, 96, 160-163, 168-169, 179-197, 200-209, 213, 215-216, 218 and 220-227 are rejected under 35 U.S.C. §103 as defining subject matter which is allegedly rendered obvious by the teachings in U.S. Patent No. 4,808,395 to Yoshimura, et al. ("Yoshimura, et al.") in view of U.S. Patent No. 4,808,395 to Reck, et al. ("Reck et al.") with Shigematsu (Idemitsu Tokoho article) allegedly cited to show states of fact. Finally, Claims 45-54, 58, 62-63, 65-78, 83-84, 96, 160-163, 167-169, 171-183, 187-188, 192-202 are rejected under 35 U.S.C. §103 as defining subject matter which is allegedly rendered obvious by the teachings in an article by Kratschmer, et al. in Chemical Physics Letters, 1990, 170, 167-170 ("Kratschmer, et al."), in view of U.S. Patent No. 3,094,428 to Hamilton et al. ("Hamilton, et al.") in view of an article by Kargin, et al. in Colloid Journal of the USSR, 1967, 29, 256-259 ("Kargin, et al.").

In response thereto, applicants have amended the claims, which, when considered with the comments herein, are

deemed to place the present case in condition for allowance. Favorable action is respectfully requested.

Applicants have canceled Claims 160-180 and 182-202 without prejudice, but they have not abandoned the subject matter therein. Moreover, applicants reserve the right to file a continuation application directed thereto. As amended, the present application is directed to a process for making C_{60} and C_{70} molecules in macroscopic amounts.

Applicants have also amended Claims 45, 50, 66, 67, 68, 69, 70, 71, 83, 84, 181, 204, 212, 213, 222 and 230 by reciting that the first step in the present process is vaporizing elemental carbon. Support is found on Page 2, Lines 26-30 of the instant specification.

In support of the objection to the specification and the rejection of Claims 45-67, 71-84, 96, 160-171, 175-196, 200-209, 213, 215-216, 218 and 220-227 under 35 U.S.C. §112, first paragraph, the Office Action alleges that the specification is enabling only for producing C_{60} and C_{70} from vaporizing elemental carbon. Although applicants disagree, in order to advance prosecution of the present case, applicants have amended the claims to recite that elemental carbon is utilized to prepare the carbon vapor utilized in the present process. Thus, the objection to the specification and the rejection of these claims on these grounds is obviated, and withdrawal thereof is respectfully requested.

In support of the second rejection under 35 U.S.C. §112, first paragraph, the Office Action alleges that the specification does not describe "caged molecules", "carbon alleotrope" and "fullerene" and is not enabling for their preparation in the amounts specified in Claim 160, 182 and 187. The Office Action also alleges that the literal language only supports the production of C_{60} and C_{70} in quantities sufficient

to produce coatings that are 2 microns thick. It further alleges that the application is not enabling and does not describe larger quantities of C₆₀.

Although applicants disagree that the specification is non-enabling and does not describe "carbon alleotrope", "caged molecules" and "fullerenes", in order to advance the prosecution of the present case, applicants have canceled claims containing said terminology from the instant application. Thus, these objections to the specification and rejection of claims containing such terminology is rendered moot.

With respect to the objection to the term "macroscopic", it appears that the Office Action is confusing the enabling requirement with the description requirement. According to the Office Action,

The specification is also not ... commensurately enabling because the scope of the claims is broadened from the original disclosure, in that they now embrace [sic] formation and [sic] isolation of very large quantities of C₆₀ (e.g., one ton), while the original disclosure's literal language only supports the production of C₆₀/C₇₀ quantities sufficient to produce coatings that are 2 microns thick. There is no disclosure supporting or describing larger quantities of C₆₀ as are now embraced by the claims.

The Office Action in its rejection is treating enablement and the description requirement as one and the same; however, they are two separate and distinct issues, and each will be treated separately.

With respect to the description requirement, there is adequate support in the application for the term "macroscopic". Literal support is not necessary for compliance with the description requirement as long as the application conveys the concept to the skilled artisan. This the application adequately does.. More specifically, support for this term and concept permeates the specification. For example, attention is

directed to Page 7, Lines 10-25, Page 8, Lines 3-16 and to Example 1 of the instant specification wherein the color of the product produced therefrom is indicated. Obviously, one cannot determine color unless it is present in amounts that can be seen with the naked eye, i.e., macroscopic amounts. If less than macroscopic amounts were produced, no color would be seen even if the samples were dissolved in benzene. See, Curl, et al, Scientific American 1991, 54-55. Furthermore, attention is directed to Figure 2, of the instant specification wherein a X-ray diffraction pattern is provided of a product produced in accordance with the present invention. As the skilled artisan is well aware, macroscopic quantities had to be available to generate a X-ray diffraction of the product. In addition, attention is directed to Page 11, Line 30 of the instant specification wherein it is indicated that the IR is taken of an approximately two micrometer thick C₆₀ coating on a silicon substrate. Especially since C₆₀ is colored, it is obvious that this coating had to be seen with the naked eye. Furthermore, the application makes additional references to characteristics of the product that can only be discernible if the material is present in macroscopic amounts. For example, the application describes that the product is a powder (Page 7, Line 25). Furthermore, the application describes that the product produced by sublimation of the carbon soot can range from a uniform film to a coating, and the color is brown to gray depending on the thickness of the coat formed, while the product obtained from extraction is a dark brown to black crystalline material. Obviously, these characteristics can be differentiated if the product was produced in amounts that can be seen with the human eye.

It is important to keep in mind that which was not stated; if the products produced can only be detected through

instrumentation, such representation would have been made in the application and evidence supporting same such as electron micrographs would have been provided. In fact, the application acknowledges that C₂₄₀ was observed from a scanning tunneling microscopic image. The fact that such statements were not made and such evidence was not provided with respect to C₆₀ and C₇₀, for example, is further evidence that these products were formed in macroscopic amounts.

Case law has held that the description requirement is meant if the application conveys to the skilled artisan that the applicants has possession of the invention at the time of the filing. Vas Cath Inc. v. Mahurkar, 935 F.2d 1535, 19 USPQ2d 1111 (Fed. Cir. 1995). Attention is directed to Kroto Declaration Paragraphs 14 and 15, previously submitted in which he attests that the application adequately describes the method for making macroscopic amounts of fullerenes, such as C₆₀ and C₇₀ and that the inventors had in their possession at the time of the filing of the application macroscopic amounts of same. Kroto, who is a skilled artisan in the field, understood from reading the application that the applicants had made macroscopic amounts of fullerenes and had it in their possession at the time of the filing of the application, providing further evidence that there is adequate support in the specification for the term "macroscopic".

The present situation is not unlike that in In re Smythe, 480 F.2d 1376, 178 USPQ 279 (CCPA 1973). In Smythe, the invention related to a "continuous automatic analysis system where discrete liquid samples...are successfully introduced into an apparatus as a continuous stream, the individual samples being separated by a segmentizing medium." Both the specification and original claims identified this

medium as "air or other gas which is inert to the liquid." The applicant later added claims that described the medium as "inert fluid". The United States Patent and Trademark Office rejected the added claims on the basis of the description requirement, but the Smythe Court reversed, stating that the use of the term "inert fluid" would naturally occur to the skilled artisan reading the description of the use of air or other gas as a segmenting medium to separate the liquid samples. Id at 1384, 178 USPQ at 285. The court provided its rationale as follows:

....[W]hereas the broader concept of using "inert fluid" would naturally occur to one skilled in the art from reading appellants' description of the use and functions of the segmenting medium specifically described, we see no basis for denying appellants the claims which recite the segmenting medium broadly as "an inert fluid". The alternative places upon patent applicants, the Patent Office, and the public the undue burden of listing, in the case of applicants, reading and examining, in the case of the Patent Office, and printing and storing, in the case of the public, descriptions of the very many structural or functional equivalents of disclosed elements or steps which are already stored in the minds of those skilled in the arts, ready for instant recall upon reading the descriptions of specific elements of steps.

We are not saying that the disclosure of 'air or other gas which is inert to the liquid' sample by itself is a description of the use of all 'inert fluid' media. Rather, it is the description of the properties and functions of the 'air or other gas' segmentizing medium described in appellants' specification which would suggest to a

person skilled in the art that appellants' invention includes the use of 'inert fluid' broadly...

A hypothetical situation may make our point clear. If the original specification of a patent application on the scales of justice disclosed only a 1-pound 'lead weight' as a counterbalance to determine the weight of a pound of flesh, we do not believe the applicant should be prevented, by the so-called 'description requirement' of the first paragraph of §112, or the prohibition against new matter of §132, from later claiming the counterbalance as a 'metal weight' or simply as a 1-pound 'weight', although both 'metal weight' and 'weight' would indeed be progressively broader than 'lead weight', including even such an undisclosed, but obviously art-recognized equivalent, 'weight' as a pound of feathers. The broader claim language would be permitted because the description of the use and function of the lead weight as a scale counterbalance in the whole disclosure would immediately convey to any person skilled in the scale art the knowledge that the applicant invented a scale with a 1-pound counterbalance weight, regardless of its composition. (Emphasis in original)

The Smythe Court held that the description in the application suggested to the skilled artisan the broader term. Similarly, as in Smythe, the present application supports the concept "macroscopic amounts of fullerenes". Based upon all of the evidence referred to hereinabove, the specification conveys to the skilled artisan that the applicants had in their possession concept of macroscopic amounts of C₆₀ and C₇₀ as testified by Kroto in Kroto Declaration, Paragraph 15.

According to the Office Action, the literal language of the original disclosure supports the production of fullerene in quantities sufficient to produce coatings that are 2 microns thick. Although the specification supports the production of C_{60} and C_{70} in macroscopic amounts, even if the allegation in the Office Action were accepted as correct, this is an admission by the United States Patent and Trademark Office that significant amounts of C_{60} and C_{70} were prepared. Moreover, assuming that allegation were correct, much more C_{60} and C_{70} could be prepared, including tonnage quantities, if the process were repeated again and again. Thus, even with the Office Action's assumptions, assuming sufficient amount of carbon source were utilized, macroscopic quantities of C_{60} and C_{70} could be produced.

Thus, the application fully complies with the description requirement of 35 U.S.C. §112, first paragraph.

In addition, the specification fully complies with the enablement requirement of 35 U.S.C. §112, first paragraph, and adequately teaches one skilled in the art how to make the claimed invention without an undue amount of experimentation. The specification provides the general teaching to the skilled artisan of how to prepare C_{60} and C_{70} in macroscopic amounts. Attention is again directed to the Declaration of Kroto, paragraphs 3, 8 and 15, wherein he attests that the application adequately describes how to make fullerenes, including C_{60} and C_{70} , in macroscopic amounts. Contrary to the allegations in the Office Action, case law does not require the applicant to describe in their specification every conceivable embodiment of the invention. US v. Teleelectronics, 857 F.2d 778, 786, 8 USPQ 2d 1217, 1222 (Fed. Cir. 1988) (citing SRI Int'l v. Matsushita Elec. Corp. of America, 775 F.2d 1107, 1121, 227 USPQ 577, 586 (Fed. Cir. 1985)). It is not therefore necessary

to specifically exemplify that tonnage quantities can be made in accordance with the present process. The specific teachings and exemplification in the specification provide an adequate teaching to accomplish this objective.

In the rejection, the Official Action states that the original language of the specification only supports the production of C₆₀/C₇₀ in quantities sufficient to produce coatings that are 2 microns thick. This amount produced is described in Ex. 1, and is only exemplary of the amount of product that could be produced by the present process. The U.S.P.T.O. is utilizing an engineering issue involving "scaling up" to support its allegation of lack of enablement. This is contrary to case law. There is nothing in the law which requires the applicants to scale up the amount of products prepared by their process. This is an inappropriate basis for supporting an allegation of non-enablement. Moreover, based upon the teachings, the skilled artisan can scale up the amount of product produced without an undue amount of experimentation. For example, if a greater amount of carbon source were used, additional material would have been collected. Moreover, if the exact methodology in Ex. 1 were repeated an infinite amount of times, there can be no question that an infinite amount of material would be collected. Thus, it is absurd for the United States Patent and Trademark Office to state that there application is not enabling for the larger quantities of product to be produced.

Thus, the application is enabling for the subject matter claimed. Therefore, the rejection of the claims under 35 U.S.C. §112, first paragraph, is obviated, and withdrawal thereof is respectfully requested.

Thus, the specification complies with the requirements of 35 U.S.C. §112, first and second paragraphs.

Consequently, the rejection of the claimed subject matter in Claims 45-67, 71-84, 96, 160, 213, 215-216, 218 and 220-227, 203-229 on these grounds is obviated; withdrawal thereof is respectfully requested.

The Office Action has rejected Claims 83-84, 160-181, and 222-224 under 35 U.S.C. §112, second paragraph. Inasmuch as Claims 160-180 and 182-202 have been canceled without prejudice, the rejection is rendered moot with respect to these claims.

Applicants respectfully submit that the remaining claims clearly define the metes and bounds of the invention. The Office Action has improperly rejected the claims under 35 U.S.C. §112, second paragraph.

For instance, in support of the rejection of Claims 181, the Office Action alleges that it is unclear as to how much constitutes "amounts ... capable of extracting and recovering said alleotrope (C_{60}) in solid form." Specifically, the Office asks what is the lower limit.

Applicants respectfully submit that the claims, as recited, clearly define the metes and bounds of the invention. However, the Office Action has improperly rejected the claims under 35 U.S.C. §112, second paragraph. Instead of reading the claims as a whole, as required by law, the Office Action has raised issues with individual terms taken out of context.

For instance, Claim 181 recites that C_{60} , is present in both the soot and the extract from the soot in such amounts that it can be recovered therefrom in amounts that could be seen with the human eye. The claims connote this amount in functional language by reciting that the C_{60} is present in amounts capable of extracting C_{60} from the soot in solid form and that it is recovered as a solid. Applicants submit that

the presence or absence of sufficient material to be visible as a solid is a characteristic that is easily determinable.

However, the Office Action alleges that such a limitation is indefinite, and specifically asks "... if ... a microgram of C_{60} was an amount needed to qualify as solid C_{60} , would a process which produced a kilogram of soot which in toto contained microgram of C_{60} , ... be within the claims...?" In addition, the Office Action raises the question, "what is the lower limit?" First, case law has held that lower limits need not be recited to comply with 35 U.S.C. §112, second paragraph. See, In re Kirsch, 498 F.2d 1389, 1393-1394, 182 U.S.P.Q. 286, 290, (CCPA 1974). But more importantly, how can anything be more definite than visible versus not visible? From the beginning of time, man has relied upon his senses to determine if something is present, hence the adage "seeing is believing". The amount of C_{60} and/or C_{70} produced by the process of the present invention is in macroscopic amounts, amounts which are definitely discernible by the human eye. Thus, there is no indefiniteness in the amount produced. The objective test is whether visible amounts, that is, amounts sufficient to see, touch, and feel of C_{60} and/or C_{70} are recovered. What can be more clear than that?

The same comments apply to the rejection of Claims 83 and 84 wherein it is recited that the product is formed in amounts sufficient to be capable of forming a colored solution when dissolved in benzene. Again, the Office Action takes the position that something which is definite within the meaning of 35 U.S.C. §112, second paragraph is indefinite. These claims again recite another test of whether appreciable amounts of C_{60} and/or C_{70} are formed. If the benzene solution remains uncolored when C_{60} and C_{70} is placed into sufficient benzene to dissolve the C_{60} and/or C_{70} , then insufficient amounts of

product are generated. The U.S.P.T.O. raises the issue that this is indefinite, alleging that visual acuity varies from person to person; however, the test is color versus no color, i.e., something which is easily determinable and discernible, and which is an objective rather than subjective standard.

In both situations, the U.S.P.T.O. has failed to consider the history regarding fullerenes. Heretofore, no one had generated enough fullerenes such as C_{60} , to be seen with the naked eye or as indicated in Curl, et al., in Scientific American, 1991, Page 55, when dissolved in benzene produced a colored solution. However, the methodology of the present process produces such appreciable amounts of C_{60} and/or C_{70} that they can be visibly seen or that they produce a colored solution when the entire product of C_{60} and/or C_{70} produced is placed into benzene. Not only does this distinguish over the prior art, but as indicated hereinabove these are simple tests to easily ascertain whether the requisite amount of product is produced. The Office Action appears to have misinterpreted the claims; it utilizes as the standard the amount of sooty carbon product produced which when placed into benzene forms a colored solution. The claims do not use this as the criteria, it is the amount of C_{60} and/or C_{70} produced which when placed in benzene, produces the colored solution. If a colored solution is produced under these circumstances then it meets the test recited in Claims 83 and 84.

Applicants submit that this language in the claims clearly delineates the metes and bounds of the claims.

Thus, for the reasons provided, the rejection of the claimed subject matter under 35 U.S.C. §112, second paragraph, is obviated. Withdrawal thereof is respectfully requested.

The Office Action alleges that Claims 45-84, 96, 160-231 conflict with Claims 45-68 of USSN 08/486,669, and require

Applicants to either cancel the conflicting claims or to maintain a clear line of demarcation between the applications. This is an improper rejection since there is no statutory basis for the rejection. Nevertheless, there is a line of demarcation between the claimed subject matter in the present application and the claims in copending application USSN 08/486,669. The present case is directed to a process of preparing C₆₀ and or C₇₀ or products containing same, while the copending application is directed to processes for preparing fullerenes and/or products containing same. Thus, there is a clear line of demarcation between the applications.

Pursuant to the provisional rejection of Claims 45-84, 96 and 160-231 under the judicially created doctrine of obviousness-type double patenting, the Office Action cites Claims 45-68 of copending application USSN 08/486,669.

Since the claims in neither application has been patented, it is premature to reject the claims on this ground at this time, especially since these may not be the final version of the claims. When one of the applications matures into a patent, then it would be the appropriate time to raise this issue.

In addition, applicants further submit that the provisional double patenting rejection is not applicable in the present circumstances.

In considering the question of obviousness-type double patenting, only the claims of the two applications are compared. Quad Environmental Technologies, Corp. v. Union Sanitary District, 946 F.2d 870, 873, 20 U.S.P.Q. 2d 1392, 1394. The question to consider is whether any claims in the two applications define merely an obvious variation of an invention disclosed and claimed. In re Vogel, 442 F.2d 438, 441, 164 U.S.P.Q. 619, 622 (CCPA 1970).

The Office Action alleges that the claims are not patentably distinct from each other because the respective claims only differ in the functional recitation of how much C₆₀ fullerene is made in the carbon vaporization process. It further alleges that the subject matter in both application is directed to the production and recovery of C₆₀ fullerenes. However, applicants respectfully submit that the claims in the two applications do not differ in the manner alleged in the Office Action. The present application is directed to a process of making C₆₀ and/or C₇₀ in macroscopic amounts while the '669 application is directed to the process of making fullerenes in macroscopic amounts. The subject matter of the present application is thus not directed to the same patentable invention as that of copending '669 application. Consequently, the rejection of the claimed subject matter on these grounds is obviated and withdrawal thereof is respectfully requested.

Inasmuch as Claims 182-191 and 194-202 have been canceled without prejudice, the rejection of these claims under 35 U.S.C. §102 as allegedly being anticipated by Bacon has been rendered moot.

Pursuant to the rejection of Claims 45-54, 58, 62-63, 65, 76-80, 83-84, 96, 160-163, 168-169, 179-196, 200-209, 213, 215-216, 218 and 220-227, the Office Action cites Yoshimura, et al. in view of Reck, et al. and allegedly cites Shigematsu only to show certain facts.

Applicants respectfully submit that Yoshimura et al. are totally unrelated to the present process.

More specifically, Yoshimura et al. teach the production of carbon black from hydrocarbons in a carbon black producing furnace which contains a first zone where an oxygen containing gas and a fuel are mixed to form a high temperature combustion gas and a second zone wherein the high temperature

combustion gas flows and wherein hydrocarbon material is jetted and introduced into the high temperature combustion gas to subject the hydrocarbon to thermal decomposition and or incomplete combustion to form carbon black.

Their process involves the partial or complete hydrocarbon material. Thus, the components utilized in the present process and that in cited prior art are quite distinct. Yoshimura, et al. require the use of a hydrocarbon, while in the present process, elemental carbon is utilized. There is nothing in Yoshimura, et al. that would suggest the use of elemental carbon, as in the present process; in fact, quite the opposite, Yoshimura, et al. require a hydrocarbon material in its process. Attention is directed to Column 4, Lines 62 to Column 5, Line 12 of Yoshimura, et al.

Moreover, the Yoshimura, et al. process involves the combustion of a hydrocarbon material, which is in contrast to the present process in which elemental carbon is vaporized in the presence of an inert quenching gas. Nowhere in the patent is there a teaching or suggestion that elemental carbon could be utilized in the Yoshimura, et al. process; their process requires the presence of a hydrocarbon gas to be subjected to thoroughly thermal decomposition and/or incomplete combustion. See Column, 4, Lines 1 to 45. In contrast, the elemental carbon in the present process is not subjected to thermal decomposition and/or incomplete combustion. Thus, Yoshimura, et al. teach away from the present process.

In addition, the process of Yoshimura, et al. is a combustion reaction, i.e, an oxidation of a hydrocarbon. This is in sharp contrast to the present process in which elemental carbon is vaporized. Vaporization is a process which is totally distinct from combustion.

Reck et al., do not overcome the deficiency of the primary reference. This reference discloses a process for removing extractable from carbon blacks in a fluidized bed, wherein low extractable carbon blacks are treated under mild temperature conditions (320°C) with an oxygen containing gas and high extractable carbon blacks are treated first at 100°-320°C with steam and then at 200-500°C with an oxygen containing gas. As indicated hereinabove, it suggests the use of oxygen containing gas, for the extraction step, which step is not utilized by the present invention. Reck et al., are limited to the process of removing extractables from carbon black in a fluidized bed. It is completely silent as to the formation of the carbon black, which methodology is different from the present process. Thus, the combination of the two references would suggest the combustion of a hydrocarbon source in the presence of oxygen and then removing extractables. Thus, since Reck et al., do not teach, disclose or suggest the step of vaporizing elemental carbon in the presence of an inert quenching gas, the teachings therein are irrelevant. Thus the combination of Yoshimura, et al. and Reck, et al. do not teach, disclose or suggest the vaporization of a carbon source in the presence of an inert quenching gas to produce a sooty carbon product comprising macroscopic amounts of C₆₀ and/or C₇₀ and extracting the C₆₀ or C₇₀ from the soot, as presently claimed.

Although, the Japanese reference may teach that a ten-hour Soxhlet extraction of 3 kg of conventional carbon black would yield 5.0 mg of C₆₀, this was published after the filing of the present application and as such is not a reference. However, the Office Action cited it to allegedly show that C₆₀ is produced via Soxhlet extraction of carbon black with toluene. Even if the teaching therein is true, it is totally irrelevant, since the teachings in the secondary

reference do not overcome the inadequacies of the primary reference.

Therefore, this rejection of the Claim under 35 U.S.C. §103 is obviated and withdrawal thereof is respectfully requested.

Pursuant to the rejection of Claims 45-54, 58, 62-63, 65-78, 83-84, 96, 160-163, 167-169, 171-183, 187-188, and 192-202, the Office Action cites Kratschmer, et al. in view of Hamilton et al. and Kargin, et al.

Kratschmer, et al. describe a process of preparing carbon smoke particles by evaporating graphite rods by resistive heating in a conventional glass bell evaporator filled with an inert quenching gas such as helium at pressures greater than, for example, 100 Torr. It also discloses collecting the smoke. The article postulates that C_{60} may be present in the smoke. But, in contrast with the present invention, the reference does not teach, disclose or suggest how to extract the C_{60} from the soot. Thus, the reference never separated the C_{60} from the soot.

The Office Action agrees, and it cites Hamilton, et al. and Kargin, et al. to allegedly overcome this deficiency.

According to the Office Action, Kargin, et al. disclose that carbon particles made from the condensation of carbon vapor in an argon atmosphere can be deemed to be carbon black. The Examiner further alleges that the carbon particles were prepared from a graphite anode and cathode opposed to one another, wherein a plasma is formed therebetween by passing current to the electrodes. The Office Action then cites Hamilton, et al., alleging that it discloses that carbon black is dispersed in benzene to form ink compositions. The Office Action concludes that it would have been obvious to have dispersed the carbon smoke particles of Kratschmer, et al. in

benzene because Hamilton, et al. "teach that it is known to disperse carbon black in benzene in order to form ink compositions or rubber compositions and because Kargin, et al. would teach...to recognize Kratschmer's particle as being carbon black."

Contrary to the allegations in the Office Action, the combination does not teach, disclose or suggest the present process. The analysis of the Office Action is based upon an oversimplification of the references and incorrect assumptions.

Assuming, pro arguendo, that the teachings, in Kargin, et al. is correct and that the vaporization of graphite under their conditions produced carbon black, there is nothing in the reference which suggests any C_{60} and/or C_{70} were formed by their process. The combination, under this assumption, would suggest at best that the sooty carbon product produced by the process described by Kratschmer, et al. would contain carbon black, but, as shown in the present invention, when carbon is vaporized in accordance with the process of the present invention, the carbon smoke contains in addition to the graphitic soot, some C_{60} , C_{70} and other fullerenes. Surely, the Office Action cannot be suggesting that the carbon black and fullerenes are the same since fullerenes, such as C_{60} and/or C_{70} , have been shown to be distinct from carbon black. Thus, contrary to the allegations of the Office Action, Kargin, et al. cannot be suggesting or teaching a process for making C_{60}/C_{70} as presently claimed.

Moreover, Hamilton, et al., contrary to the allegations in the Office Action, do not suggest that carbon black alone is placed in benzene. On the contrary, the carbon black is admixed with a metal oxide and it is this combination which is dispersed in benzene. There is nothing in the reference which would suggest that a vaporized carbon in the

absence of any metal oxide would be placed in benzene as presently recited in some of the claims. Thus, the combination of the cited references would not teach, disclose or suggest the process of vaporizing carbon in the presence of an inert gas under conditions effective to produce a sooty carbon product comprising C₆₀ and/or C₇₀ present in macroscopic amounts and extracting C₆₀ and/or C₇₀ from the sooty carbon product, as presently claimed.

Moreover, there is no motivation to combine the references, as the Office Action has done. As indicated in Hamilton, et al. when the carbon black in admixture with the metal oxide is placed in alcohol, benzene, etc., a dispersion is formed, which is the objective of Hamilton, et al. On the contrary, in the present process the objective of the present process is to separate the fullerenes from the sooty carbon product. There is nothing in Hamilton, et al. alone or in combination with the other references that would suggest that C₆₀ or C₇₀ could be separated from the sooty carbon product produced by Kratschmer, et al. by placing the soot comprising C₆₀ and/or C₇₀ and other fullerenes in benzene. More specifically, there is no teaching or disclosure that would suggest that C₆₀ and/or C₇₀ would dissolve in the benzene. Thus, there would be no reason for the skilled artisan to combine the teachings of Hamilton, et al. with the Kargin, et al. and Kratschmer, et al. Under §103, teachings of references can be combined only if there is some suggestion of incentive to do so. ACS Hospital Systems Inc. v. Montifiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). Absent some teachings or suggestion supporting the combination, obviousness cannot be established. Id. Inasmuch as there is no teaching or suggestion to combine the teachings of the cited

references, a prima facie case of obviousness has not been made out.

Furthermore, applicants submit that Office Action has used hindsight in evaluating the present invention to support an incorrect finding of obviousness. It is impermissible to utilize the disclosure of the invention as a blueprint and then view the prior art in such a manner as to select bits and pieces of that art to reconstruct applicants' invention, as the Office Action has done. Sensonics Inc. v. Aerosonic Corp., 81 F.3d 1560, 38 USPQ2d 1551 (Fed. Cir. 1996).

Accordingly, the rejection of the claims under 35 U.S.C. §103 as allegedly being rendered obvious by the teachings of Kratschmer, et al. in view of Kargin, et al. and Hamilton, et al. is obviated. Withdrawal thereof is respectfully requested.

Thus, in view of the amendment to the claims and the remarks hereinabove, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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